

**Fiscal Impact Report
for the
Indiana Department of Homeland
Security**

***For Hospital Construction in Accordance
with ASHRAE 90.1 Energy Standard***

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I. DISCLAIMER

The State of Indiana requires a fiscal impact statement when a new rule or statute is being considered for adoption. BSA LifeStructures volunteered to perform this study as a public service to the people of Indiana. BSA LifeStructures is Indiana's leading healthcare design firm and therefore has the expertise and knowledge to make this analysis based on professional judgment and the expected standard of care for the healthcare design industry.

This study was done as a "comparison" analysis and therefore only represents "comparison" values in lieu of absolute values. The purpose of this report is only for the fiscal impact of designing a hospital per ASHRAE 90.1–2007 as compared to the 1992 Model Energy Code. In many cases, the requirement of the 1992 Model Energy Code is antiquated. The standard of design today exceeds the requirements of the 1992 Model Energy Code in many areas. Therefore, the comparison between the two scenarios represents a skewed comparison but nevertheless meets the requirement of the fiscal impact study.

While this study is representative of the real approximate difference in cost between the two scenarios compared, it should not be used as a metric for hospital design. The costs were based on estimates completed on a recently designed hospital and then interpolated for the difference in the two scenarios. It can be argued that the method used to determine the real cost difference will not accurately reflect the real market construction cost differences. However, for the purposes of this study, the important element is the determination of whether designing a hospital per ASHRAE 90.1–2007 as compared to the 1992 Model Energy Code has a fiscal impact to the State of Indiana. Even using a large probability of error in the costs, the results of the study would remain as stated in the executive summary.

II. SCOPE AND APPROACH

The scope of this study is for a new generic 400,000 square foot full service 5-story hospital built in St. Joseph County Indiana. A large 3-story parking garage would be associated with the hospital. The hospital would be of the least restrictive design with conservative architectural features and materials.

The study is to compare the cost of building a new hospital to the ASHRAE 90.1-2007 Energy Standard to the cost of building it to the current Indiana State 1992 Model Energy Code. This is the requirement to determine the fiscal impact of the proposed rule or statute to the citizens of Indiana.

The approach to this study was to hold constant every common element between the two comparison hospitals except those that were prescriptively defined in the 1992 Model Code or ASHRAE 90.1-2007 Energy Standard. Those elements that differed would then be analyzed and their cost impact on the hospital would be determined.

ASHRAE 90.1-2007 Energy Standard and the current Indiana State 1992 Model Energy Code are not always directly comparable. Many prescriptive items in ASHRAE 90.1-2007 Energy Standard are not in the Indiana State 1992 Model Energy Code and vice versa. Where the prescriptive items were defined, they were used in the analysis. Where they were not defined, assumptions were made. A table of assumptions is listed in section VI.

The basis for making assumptions was to apply the current “standard of care” or “best practice” now being used in hospital design as the default value when the prescriptive data was not defined. This should represent the true fiscal impact if the ASHRAE standard were adopted.

The Trane *Trace* energy simulation software was used to determine the energy use of the comparison hospitals. The output was used to determine the relative energy savings as well as the resultant parameters to size and cost equipment and systems.

Although the energy cost savings for the implementation of the ASHRAE Standard is irrelevant to the fiscal impact statement, it is important to note that significant energy cost savings occurs when the ASHRAE Standard is applied.

III. EXECUTIVE SUMMARY

Primary Study Results:

- To build a new hospital in Indiana per ASHRAE 90.1-2007 Energy Standard as compared to building the same hospital per the 1992 Model Energy Code has no fiscal impact. The result of this study indicates that there would be a reduction in cost if the new hospital is built per ASHRAE 90.1-2007 Energy Standard (See section V). The increase in cost for a better building envelope is offset by a larger reduction in mechanical and electrical system cost.

Secondary Study Results:

- The estimated reduction in energy to build a new hospital in Indiana per ASHRAE 90.1-2007 Energy Standard as compared to building the same hospital per the 1992 Model Energy Code is approximately 10%. The savings in energy cost is approximately 15% (The difference between the two is reflected in the cost of gas verses electric).
- The parking garage would have the same cost when designing per the Indiana per ASHRAE 90.1-2007 Energy Standard as per 1992 Model Energy Code.

IV. ASSUMPTIONS

The hospital used as a basis for comparison is a 5-story, 400,000 square foot facility with the following layout:

- 1st Floor:

Central Sterile/Storage:	25,000 sqft.
Support (Kitchen Services):	30,000 sqft.
Radiology:	25,000 sqft.
Surgical Suite:	20,000 sqft.
Emergency Department:	30,000 sqft.
Administration:	30,000 sqft.

- 2nd – 5th Floors (Two separate towers)

Patient Rooms (Total):	115,200 sqft.
Core Area (Total):	124,800 sqft.

- Floor to Floor Height

1 st Floor: 18'-0":	9'-6" Ceilings
2 nd - 5 th Floors: 15'-4":	9'-0" Ceilings

- Fenestration:

1 st Floor:	20% Glass on all sides
2 nd - 5 th Floors:	30% Glass on all sides

Refer to the appendix (Section VI) for additional assumptions.

V. FISCAL IMPACT

The following are the cost differences or fiscal impact between the 1992 Model Energy Code and ASRAE 90.1 Standard. All other items had no cost impact.

<u>System</u>	<u>Cost</u>
Above Grade Wall Construction.....	\$43,900
Roof Construction.....	\$102,900
Air Distribution.....	-\$988,400
Cooling.....	-\$340,800
Heating.....	-\$322,100
Electrical Power.....	-\$654,600
Lighting.....	-\$657,400
Lighting Control.....	\$100,000
Service Heating.....	\$50,000
Total Cost Impact.....	-\$2,666,500
Total Cost Impact per Square Foot.....	-\$6.67

VI. APPENDIX

See the following pages.